

WHAT IS CLAIMED IS:

1. An electron beam proximity exposure apparatus, comprising:
an electron beam source which emits an electron beam;
an electron beam shaping device which shapes the electron beam;
a mask which has an aperture and is disposed on a path of the shaped electron beam;
a deflecting and scanning device which deflects the electron beam to scan the mask with the shaped electron beam; and
a stage which holds and moves an object,
wherein the mask is disposed in proximity to a surface of the object, and a pattern corresponding to the aperture of the mask is exposed on the surface of the object with the electron beam having passed through the aperture,
wherein the electron beam shaping device shapes the electron beam into a slender beam of which cross section has a small width in a direction of the scanning and a large width in a direction perpendicular to the direction of the scanning.
2. The electron beam proximity exposure apparatus as defined in claim 1, wherein the electron beam shaping device comprises an electrostatic cylindrical lens which has power in a single direction.
3. The electron beam proximity exposure apparatus as defined in claim 1, wherein:
an interval between adjacent scanning lines in the scanning with the shaped electron beam by the deflecting and scanning device is satisfactorily shorter than the width of the shaped electron beam in the direction perpendicular to the direction of the scanning; and
each portion of the pattern on the object is exposed by the scanning with the electron beam of a plurality of times.
4. The electron beam proximity exposure apparatus as defined in claim 3, wherein the pattern on the object is exposed by the scanning with the electron beam of at least five times.
5. An electron beam proximity exposure method, wherein a mask having an aperture corresponding to a pattern to be exposed is disposed in proximity to a surface of an object, an

electron beam is applied to scan the mask, and a pattern corresponding to the aperture is exposed on the surface of the object with the electron beam having passed through the aperture,

wherein the electron beam is a slender beam of which cross section has a small width in a direction of the scanning and a large width in a direction perpendicular to the direction of the scanning.

6. The electron beam proximity exposure method as defined in claim 5, wherein:

an interval between adjacent scanning lines in the scanning with the electron beam is satisfactorily shorter than the width of the electron beam in the direction perpendicular to the direction of the scanning; and

each portion of the pattern on the object is exposed by the scanning with the electron beam of a plurality of times.